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(71) Applicant (for all designated States except US): **EARTH ANGEL INC.** [CA/CA]; 138 Fernwood Drive, Fredericton, New Brunswick E3A 6W3 (CA).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **BROWN, John, Phillip** [CA/CA]; 138 Fernwood Drive, Fredericton, New Brunswick E3A 6W3 (CA).

(74) Agent: **WALTER, Robert, H.**; G. Ronald Bell & Associates, P.O. Box 2450, Station D, Ottawa, Ontario K1P 5W6 (CA).

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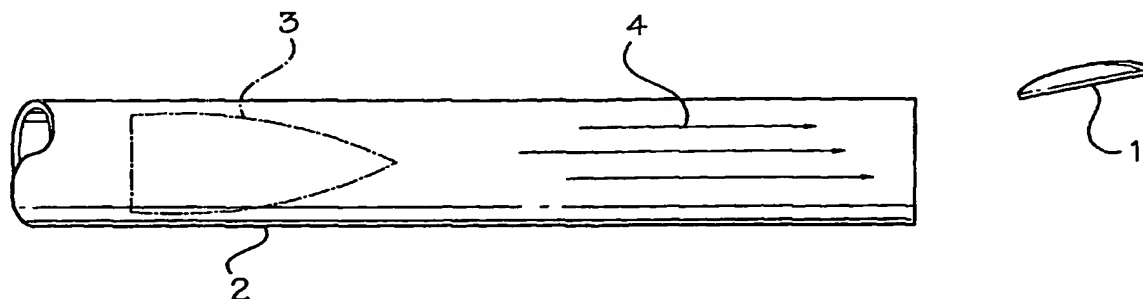
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(54) Title: CAP FOR ATTACHMENT TO A BARREL END AND STORAGE MEANS THEREFOR



(57) Abstract: A convex cap (1) for removable attachment to a barrel (2) end of projectile (3) firing equipment such as the end of a gun barrel (2), purposed to protect the interior of the projectile (3) firing equipment from foreign matter such as dust, dirt, debris and moisture wherein the cap (1) is adapted to be in place on the barrel (2) end at the time of firing. A means of storing caps is also provided.

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CAP FOR ATTACHMENT TO A BARREL END AND STORAGE MEANS THEREFOR

BACKGROUND OF THE INVENTION

The present invention generally relates to the field of weaponry and more specifically to a means of protecting the interior of projectile firing equipment, including the barrel, from foreign matter such as dust, dirt, debris and moisture including that in the form of rain and snow.

It is known in the art that debris and moisture in the barrel or other interior portions of projectile firing equipment can lead to malfunction thereof and/or physical and/or chemical degradation including corrosion. Furthermore, if firing equipment becomes plugged it may become susceptible to exploding.

Other caps have been disclosed in the art such as in United States Patent No. 3,455,047 entitled "Muzzle Patch For Firearms" issued to Hoag on July 15, 1969. Hoag describes an adhesive patch which is pressed onto the tip of a muzzle of a gun to prevent dust and moisture from entering the barrel of the gun. The patch is made of a suitable plastic such as the material used to make Scotch (trade mark) tape and need not be removed prior to firing. The properties of this patch do not provide all of the advantages of the cap of the present invention. For example, the minimal strength of the patch fails to afford the protection provided by the cap of the present invention. Also, the patch is flat which fails to accomplish the distinct advantage realized by the present invention as will become apparent from this application in its entirety.

SUMMARY OF THE INVENTION

According to an aspect of the present invention there is provided a cap for removable attachment to a barrel end of projectile firing equipment which allows substantially unaffected firing of the projectile firing equipment, wherein the barrel

end is perpendicular to a direction of firing of the projectile firing equipment, characterized by a central convex portion which covers an aperture of the barrel end; and a peripheral edge portion joined peripherally to the central convex portion and adapted to be removably attached, via an attachment means, to the barrel end and having a substantially similar form as the barrel end.

The cap generally comprises means to removably attach the cap to a barrel end of projectile firing equipment, means to reduce or inhibit entry of moisture or debris into the barrel, means to allow the projectile firing equipment to fire a projectile without significant interference caused by the cap wherein the cap is blown completely off of the barrel, and means to allow the cap to be removably attached to a storage medium. These and other means are structurally provided by appropriate shape, size, and other characteristics of the cap. The size and shape of the protector are dependent on the barrel onto which the cap is to be placed. The cap may be of various sizes in order to be used with various types of barrels and numerous gauges and calibers of guns. Also, the cap may be used for double barrel guns and magazine wells.

The cap is of convex form which allows the cap to be effectively blown off the barrel upon firing. In contrast, a flat surface may blow off only in part leaving a portion attached to the barrel. The weight of the cap and the attachment characteristics ensure that the cap will not, to any substantial degree, affect the trajectory of the projectile.

The cap provides a substantially water- and air-proof seal to the projectile firing equipment. Also, the cap is adapted to remain in place if the projectile firing equipment is jarred. The cap is also resistant to puncture.

The convex cap is adapted for removable attachment to a barrel end of projectile firing equipment and is adapted to be in place on the barrel end at the time of firing of the projectile firing equipment. Although it is not necessary, in the least, for the cap to be removed from the barrel end prior to firing, the user may remove

the cap without compromising the functioning thereof.

According to another aspect of the present invention there is provided a storage pad, comprising a substantially planar surface upon which one or a plurality of caps described above can be removably attached, the surface being so structured to removably hold the caps, such that the caps, when removed from the surface are ready for application to barrel end of a barrel. The caps may be readily removed from the storage pad without any tools. The caps, when removed from the storage pad, are in a ready-to-be applied state.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates a barrel cap according to an embodiment of the present invention in place on a barrel;

Figure 2 illustrates the barrel cap of Figure 1 which has been released from the barrel;

Figure 3 is a top plan view of the barrel cap of Figure 1;

Figure 4 is a bottom plan view of the barrel cap of Figure 1;

Figure 5 is a side view of the barrel cap of Figure 1;

Figure 6 is a top plan view of the cap according to another embodiment of the present invention; and

Figure 7 is a plan view of several caps on a storage case according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS OF THE INVENTION

As shown in the figures, a barrel cap 1 according to an embodiment of the present invention is adapted to cooperate with the end of a barrel 2, for example, a gun barrel. The cap 1 is preferably annular, and more preferably circular. As shown well in Figure 5, the cap 1 comprises two main portions, an edge portion 5 and a convex portion 6. The edge portion 5 comprises adhesive such that the cap 1 may be removably adhered to the end of a barrel 2. Although these two cap portions are described herein as two portions, the present invention embodies both the configuration where these portions form one continuous structure and that where more than one structure forms the cap.

In a preferred embodiment, the edge portion 5 comprises an intermediate portion 7 and an adhesive portion 8. The intermediate portion 7 is made of a material which is compatible in the required conditions, including contact with the convex portion 6 and a barrel 2. The intermediate portion 7 is attached to the convex portion 6 and the adhesive portion 8. An example of a suitable material for the intermediate portion 7 is aluminum. The convex portion 6 is preferably plastic and of a flexible nature such as the plastic used on a cap of a two litre plastic bottle. Therefore, as seen in the figures, the edge portion 5 comes in contact with the barrel end, and specifically the end surface of the barrel 2 perpendicular to the direction of firing.

Referring to Figure 2, when a projectile 3, for example a bullet, is fired by way of a barrel 2, air pressure 4 is created in front of the projectile. When the cap 1 is adhered to the barrel 2 the air pressure 4 exerts a force on the cap 1 causing the cap to become dislodged from the barrel 1 and released into the air. The thickness of the cap is preferably between approximately 1/8 in. and 1/64 in. and more preferably approximately 1/32 in. The adhesive is preferably Tesa P (trademark) manufactured by BDF Beiresdorf of the United States and is such that once the cap is released from the barrel, the barrel is substantially clean of any residue of the cap or adhesive.

In a preferred embodiment the edge portion 5 comprises a tape made of

aluminum foil having an adhesive on one side. This tape is preferably fused to the convex portion 6 during manufacturing.

In an alternative embodiment exemplified in Figure 6, the cap 1 comprises a tab 10 which permits the cap 1 to be readily removed from a barrel 2 or a storage means 11 as discussed below. The cap 1 is designed to be removable by the user and this tab 10 is useful in this regard.

Referring to Figure 7, a storage means 11 is illustrated which is adapted to removably hold at least one and preferably several barrel caps, such as from 4 to 24 and preferably 12. The surface of the storage means is such that the caps 1 are held in place but can be removed by a user in a state which is ready for use and preferably comprises treated material such as waxed cardboard. In particular, the adhesive remains intact while on the storage means 11 and once removed therefrom. In a preferred embodiment the storage means is approximately 2-1/8" by 3-3/8" and stores 12 caps. The storage means is preferred so dimensioned to fit in a shirt pocket or wallet.

Before applying the cap 1 to a barrel 2, the inside of the barrel 2 may be substantially cleansed of any debris, oil or the like. Also, in order to improve the functioning of the protector, the end surface of the barrel 2 may be cleansed.

A preferred height of the convex portion 6 of the cap 1 is approximately 1/16" to 1/8" excluding the edge portion 5 which is preferably approximately 1/64". A preferred radius of curvature of the convex portion 6 is approximately 9/16" to 33/32". For instance, a cap 1 with a diameter of 1/2", which would be suitable for a 308 Remington, and a height of the convex portion 6 of 1/8" would have a radius of curvature of 9/16". Alternatively, if a height of the convex portion is 1/16" and the cap diameter remains the same at 1/2" the radius of curvature of the cap would be 33/32".

In a preferred embodiment the caps are a camouflage color in order to achieve

the camouflage effect often desired when using projectile firing equipment. In an alternative embodiment, the cap includes a means for high visibility such as a means of luminescence such as a fluorescent composition.

In another embodiment of the present invention, registration numbers are provided on each cap in order to permit caps to be more readily tracked.

INDUSTRIAL APPLICABILITY

The cap for attachment to a barrel end and storage means therefor as taught herein generally provide improved means of protecting the interior of projectile firing equipment, including the barrel, from foreign matter such as dirt, debris and moisture including that in the form of rain or snow and an improved means of storing such caps.

CLAIMS:

1. A cap (1) for removable attachment to a barrel end of projectile firing equipment (2) which allows substantially unaffected firing of said projectile firing equipment, wherein said barrel end is perpendicular to a direction of firing of said projectile firing equipment, characterized by:

a central convex portion (6) which covers an aperture of said barrel end;

and

a peripheral edge portion (5) joined peripherally to said central convex portion (6) and adapted to be removably attached, via an attachment means, to said barrel end and having a substantially similar form as said barrel end.

2. A cap (1) according to claim 1 characterized in that said attachment means comprises an adhesive on said edge portion (5).

3. A cap (1) according to claim 1 or 2 characterized in that said edge portion (5) comprises an intermediate portion (7) and an adhesive portion (8), characterized in that, when said cap (1) is attached to said barrel end, said adhesive portion (8) contacts said barrel end, and said intermediate portion (7) lies between said adhesive portion (8) and said convex portion (6), and characterized in that said intermediate portion (7) is made of a material which is compatible with both said convex portion (6) and said adhesive portion (8).

4. A cap (1) according to claim 3 characterized in that said intermediate

portion (7) and said adhesive portion (8) comprise a tape having said adhesive portion (8) on one side thereof and said intermediate portion (7) on an opposite side thereof.

5. A cap (1) according to claim 3 or 4 characterized in that said intermediate portion (7) is formed of aluminum.

6. A cap (1) according to any one of claims 1 to 5 characterized in that said cap (1) provides an air- and water-tight seal when said cap (1) is attached to said barrel end.

7. A cap (1) according to any one of claims 1 to 6 characterized in that said cap (1) is resistant to puncture.

8. A cap (1) according to any one of claims 1 to 7 characterized in that said cap (1) comprises a tab (10) for gripping by a user, characterized in that said tab (10) , when said cap (1) is attached to said barrel end, extends beyond said barrel end in a direction substantially perpendicular to said direction of firing of said projectile firing equipment.

9. A cap (1) according to any one of claims 1 to 8 characterized in that said convex portion (6) comprises a plastic material.

10. A cap (1) according to any one of claims 1 to 9 characterized in that the

height of said convex portion (6) is from 1/16 to 1/8 inch.

11. A cap (1) according to any one of claims 1 to 10 characterized in that said edge portion (5) and said convex portion (6) are circular.

12. A cap (1) according to claim 11 characterized in that the radius of curvature of said convex portion (6) is from 9/16 to 33/32 inch.

13. A cap (1) according to claim 11 or 12 characterized in that the diameter of said convex portion (6) is substantially 1/2 inch.

14. A cap (1) according to any one of claims 1 to 13 characterized in that said cap (1) is provided with a registration number thereon to identify the firing of the projectile firing equipment.

15. A cap (1) according to any one of claims 1 to 14 characterized in that said cap (1) comprises camouflage coloring.

16. A cap (1) according to any one of claims 1 to 14 characterized in that said cap (1) is luminescent.

17. A storage pad (11), characterized by a substantially planar surface upon which one or a plurality of caps (1) according to any one of claims 1 to 16 can be removably attached, said surface being so structured to removably hold said caps

(1), such that said caps (1), when removed from said surface are ready for application to barrel end of a barrel.

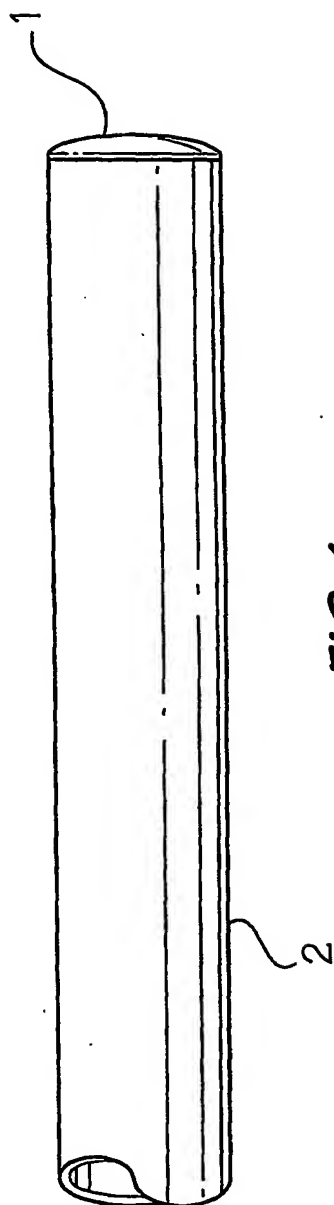


FIG. 1

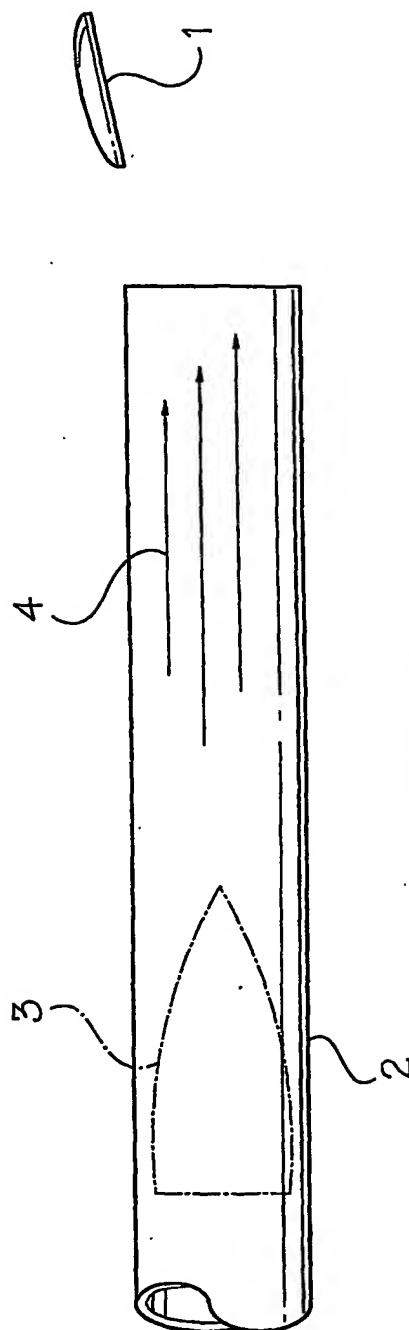


FIG. 2



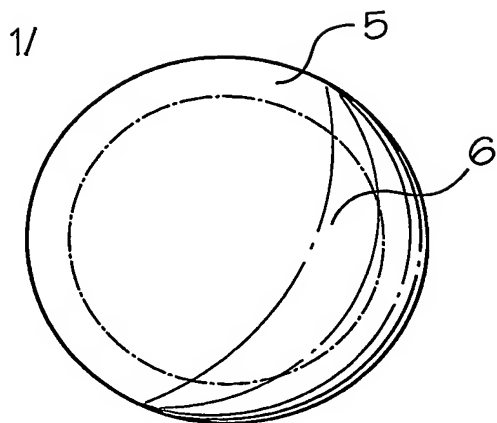


FIG. 3

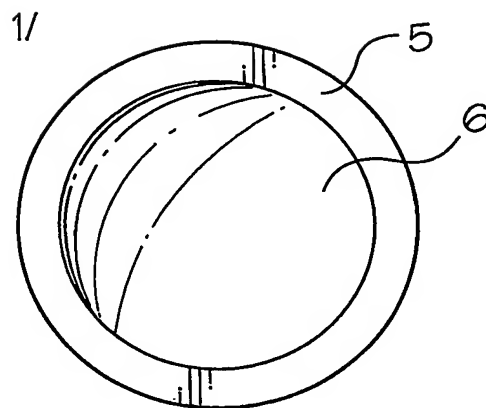


FIG. 4

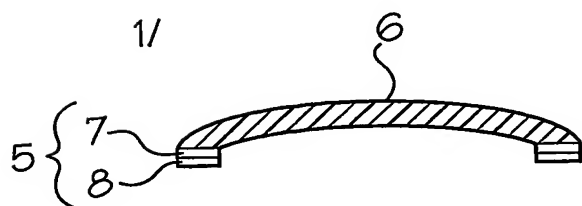


FIG. 5

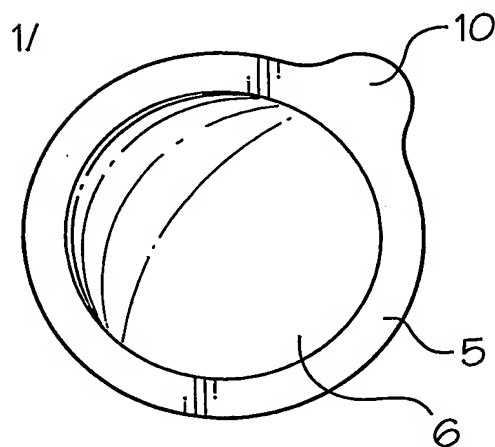


FIG. 6

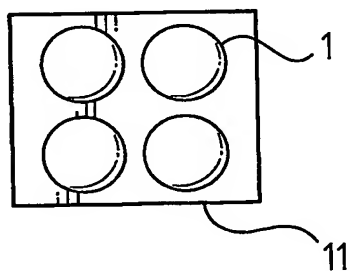


FIG. 7

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F41A35/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 F41A

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3 455 047 A (HOAG CHARLES REX) 15 July 1969 (1969-07-15) cited in the application column 2, line 10 -column 3, line 2 figures 1-6	1-17
Y	DE 19 25 178 A (RHEINMETALL GMBH) 19 November 1970 (1970-11-19) page 1, paragraph 3 -page 2, paragraph 2 page 4, paragraph 1 figures 1,2	1-17
A	EP 0 022 756 A (FOERENADE FABRIKSVERKEN) 21 January 1981 (1981-01-21)	
A	DE 11 57 966 B (PAULA LUETTRINGHAUS GEB ROENTG) 21 November 1963 (1963-11-21)	
	-/-	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.*** Special categories of cited documents:**

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Date of the actual completion of the international search

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 593 451 A (MCDONNELL JOHN J) 20 July 1971 (1971-07-20) -----	

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3455047	A	15-07-1969	NONE	
DE 1925178	A	19-11-1970	DE 1925178 A1	19-11-1970
EP 0022756	A	21-01-1981	SE 430922 B	19-12-1983
			DE 3067614 D1	30-05-1984
			EP 0022756 A2	21-01-1981
			SE 7905933 A	07-01-1981
DE 1157966	B	21-11-1963	NONE	
US 3593451	A	20-07-1971	NONE	